Table of Contents

Draft Bikeway/Pedestrianway Plan Summary

The Bikeway/Pedestrianway Plan for Jefferson County focuses on ways in which bicycling and walking can become more appealing modes of personal transportation, while recognizing the recreational, health and fitness benefits of these activities. However, this plan is not a recreation-oriented study. It follows the lead set by the U.S. Department of Transportation to undertake activities to increase levels of use and improve safety for bicyclists and pedestrians. These goals are set forth in the *National Bicycling and Walking Study*, released in 1994:

- To double the percentage of total trips made by bicycling and walking in the United States from 7.9 to 15.8 percent of all travel trips; and

- To simultaneously reduce by 10 percent the number of bicyclists and pedestrians killed or injured in traffic crashes.

As outlined in the *National Bicycling and Walking Study* and required by Congress in the 1991 Intermodal Surface Transportation Efficiency Act, states and local metropolitan planning organizations must have a bicycle/pedestrian element included in their long-range transportation plans.

The Planning Approach

The Jefferson County plan was prepared by the consulting firms of Camiros, Ltd., Bicycles &, Inc., and R.A. Smith & Associates, through a planning grant from the Wisconsin Department of Transportation, and support from six sponsoring jurisdictions - Jefferson County, Fort Atkinson, Jefferson, Waterloo, Watertown, and Whitewater. Work on the project began in May 1995 and was completed in May 1996.

Direction for plan development was provided by a Plan Advisory Committee including representatives of the Jefferson County Parks Department; University of Wisconsin-Extension, Jefferson County Office; local village managers; city public works, planning, and parks and recreation departments; and the Tour de Fort Bicycle Club. County residents and other public officials were also provided with numerous opportunities to participate and articulate their vision for bicycling and walking within their communities.

The Purpose

The Jefferson County Bikeway/Pedestrianway Plan, as funded under ISTEA, presents a great opportunity for the county to achieve a bike and pedestrian system that will benefit county residents and serve as model for successful planing and implementation in other communities. The primary objectives of this planning effort are:

- To identify desirable bicycle and pedestrian facility routes within Jefferson County and its communities along with recommended linkages between the communities.
- To develop detailed bikeway/pedestrianway plans within the communities of Fort Atkinson, Jefferson, Waterloo, Watertown, Whitewater, Johnson Creek, Sullivan, Lake Mills and Palmyra.
- To provide recommendations including but not limited to new off-road routes, improved existing street routes, signage and marking, and route promotion.
- To develop a plan which outlines recommended projects, priorities, estimated costs, and fund sources for future implementation of bikeway/pedestrianway improvements.
- To recommend specific educational and promotional approaches associated with bicycling, walking and other non-motorized alternative forms of safe transportation.

It is now up to the citizens of Jefferson County, their elected officials, and governmental staff to work together to implement the recommendations set forth in this plan.

Summary of Design Considerations

Five underlying philosophies guided development of the Bikeway/Pedestrianway Plan. These philosophies and the design treatments recommended for various situations existing within Jefferson County reflect the diverse needs of pedestrians and cyclists of varying skill levels who ride in rural and urban conditions.

1) Within communities, a network of designated bicycle facilities will encourage increased use by cyclists of all skill levels.

Major Streets that provide an only option for cross-town travel or access to destinations:

- On-street **BICYCLE LANES** are the preferred treatment. Striped bike lanes shall be a minimum of 4 feet wide, excluding curb-and-gutter, and placed on either side of street. Bike lanes act as a "host facility," sending the message to bicyclists and motorists that they are in a bicycle-friendly community.

Neighborhood Streets:

- Are usually very suitable for bicycle travel "as is" due to low traffic volumes and slow travel speeds. **NO IMPROVEMENTS** (other than routine maintenance and hazard removal) and no use of signage is typically warranted.

- Selected local streets may have directional **BIKE ROUTE SIGNS** installed to assist cyclists with cross-town navigation. Bike route designation does *not* represent an improved or widened roadway condition, but signing may encourage young and inexperienced cyclists to ride on these streets so this treatment should be used with care. Route signing should be used selectively. For example, where there are distinct benefits for bicycling on low volume streets that provide direct access to destinations.

- When bicycle travel must route onto major streets to cross bridges or other barriers, the preferred method of accommodation is to provide continuous bike lanes on the arterial rather than re-routing onto side streets before and after the barrier.

Off-Road Opportunities:

- Separated **BIKE PATHS**, also known as **MULTI-USE TRAILS**, can provide linkages in areas not served by the street system, such as along rivers, streams, utility corridors and abandoned rail lines. Paths within communities are desired to be 10 feet wide and paved to accommodate multi-use.

- For safety considerations at driveways and side streets, bicycle paths are not recommended to be constructed parallel and immediately adjacent to roadways, similar to sidewalks.

Private Commercial Development and Public Lands:

- Designated **BICYCLE PARKING** areas should be provided at businesses, schools, parks, government buildings and employment areas. Types of parking facilities used must allow for secure locking of bicycles and must be sited in a secure and convenient location.

Route Mapping:

- To enable cyclists of various skill levels to select a bike route that is appropriate for their comfort level, maps should not simply identify one route, but rather show the degree of difficulty for various routes. Maps should also clearly define information presented and state what bicycling skill level is appropriate for various situations.

2) In rural areas, directional assistance is desired to assist cyclists in selecting the most suitable routes between communities.

State and County Highways with higher traffic volumes:

- **PAVED SHOULDERS** are the preferred treatment to accommodate bicycles in rural areas. Shoulders should not be designated as bicycle lanes when motor vehicle speeds exceed 45 mph, as such riding conditions are suitable for experienced cyclists only.

County Highways and Local Roads with low traffic volumes:

- Where low traffic volumes do not warrant the expense of shoulder paving, preferred bicycle routes may be appropriately identified on **BICYCLING MAPS**. Mapping should clarify skill levels needed to bicycle on identified routes. Inclusion of a phone number to call to verify road conditions is also recommended.

- **DIRECTIONAL SIGNING** is currently preferred over the standard "Bike Route" signing in rural areas. Directional signs, which include destinations and travel distances, will assist cyclists in following the mapped routes. Standard route signs provide no directional assistance and may attract inexperienced bicyclists to ride in conditions that require a greater cycling skill level.

Off-Road Opportunities:

- **RAIL-TRAILS** provide the best opportunity for off-road riding for less experienced cyclists in rural areas. Where no suitable roadway routes can be identified, segments of trails along stream or utility corridors may be justified to connect communities with the county-wide secondary road network. Bike paths in rural areas may be 8 to 10 feet wide, paved or unpaved.

3) All streets and roadways should be designed to meet *minimal* levels of bicycle accommodation.

Major Streets within areas where alternative cross-town routes are available:

- Streets with right-hand curb lanes that are 14 feet in width, excluding curb-and-gutter, allow for shared motor vehicle/bicycle use. Unlike bicycle lanes, **WIDE CURB LANES** represent a minimal level of bicycle accommodation and should not be signed for bicycle use.

- Where bikes must travel on major streets and no extra width provisions can be accommodated, **SHARE THE ROAD SIGNING** may be warranted to warn motorists of the likely presence of bicycles. **REMOVING HAZARDS** such as unsafe drainage grates, potholes and lateral pavement cracks shall also be undertaken.

- In communities where bypass routes have been provided to accommodate through truck and auto traffic, **TRAFFIC CALMING** measures are recommended along "Main Street" to support the street as a center of community activity rather than a short-cut for fast motor vehicle travel.

Neighborhood Streets:

- **ROUTINE MAINTENANCE** and **HAZARD REMOVAL** are typically the only improvements needed. All neighborhood streets are in essence "bicycling streets" and use of signage is not recommended, unless to serve a specific directional purpose as described above.

- In areas where motor vehicle traffic is traveling at speeds faster than prudent, **TRAFFIC CALMING MEASURES** such as curb bulbs and traffic circles should be considered.

4) Pedestrian needs are best addressed through attention to site-specific design details.

Public Rights-of-Way:

- **SIDEWALKS**, at least 4 to 5 feet wide, should be provided on both sides of major streets. Walks should be provided on at least one side of residential streets, but are preferred on both sides.

- The walking environment along sidewalks can be greatly enhanced by providing a **BUFFER PLANTING STRIP** between the sidewalk and street, and planting overstory trees within this strip or at the edge of the public right-of-way.

- Sidewalks, curb ramps and other pedestrian facilities must be designed to meet **ADA ACCOMMODATIONS**. Meeting requirements of the Americans with Disabilities Act (ADA) improves the overall walking environment and benefits all pedestrians.

- Designed to primarily to slow motor vehicle traffic, several **TRAFFIC CALMING** measures offer additional benefits to pedestrians. Installing curb bulbs and using smaller turning radii at intersections are ways to effectively reduce pedestrian crossing distances and improve pedestrian visibility.

Private Development:

- Sidewalks and pedestrian accessways should be provided as part of the site's internal circulation system, providing direct access from the public right-of-way.

Recreational Opportunities:

- **MULTI-USE TRAILS** designed and constructed to proper standards provide an alternative setting for walking, jogging, bicycling, pet walking, and in-line skating activities.

5) Engineering measures alone will not create bicycle and pedestrian friendly communities.

Education:

- Most people are taught how to ride a bike when young, but few are taught how to effectively ride in traffic. Bicycling safety skills, rules of the road and trail etiquette should be taught to all age groups.

- Pedestrian education should be taught to youth of all ages, preferably as part of a school-based curriculum.

- Driver education programs and general education for motorists should be undertaken so that all county residents understand the rights and responsibilities of bicyclists and pedestrians.

Enforcement:

- Law enforcement is needed to reinforce safe bicycling and walking habits and ensure motorist compliance with traffic laws.

Encouragement:

- Developing bicycle maps, creating bicycle-friendly businesses, having strong public support for non-motorized projects, keeping bicycling and walking in the media, and increasing motorist awareness are examples of additional measures to encourage more people to walk or bike instead of driving a car.

Summary of Public Input

Following recommendations contained within the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), this planning process provided several opportunities for public officials and citizens to participate in development of the Bikeway/Pedestrianway Plan. In total, approximately 250 people assisted in identifying needs and making recommendations for bicycling and walking improvements within Jefferson County. Public input was solicited through a specially formed plan advisory committee, public workshops, key person interviews, community meetings, and distribution of a bicycle and pedestrian user survey.

Plan Advisory Committee

The entire planning process was guided by a Plan Advisory Committee, whose membership reflects a broad cross-section of bicycling and walking interests and included representatives from various jurisdictions within the county. This group met bi-monthly throughout the planning process to review work completed to date and provide direction for the consultants. Members of the Advisory Committee are also charged with obtaining endorsement of the plan by their local governmental bodies and forwarding recommendations to affected parties.

Bikeway/Pedestrianway Plan Advisory Committee Members include:

Tom Barnes	Whitewater Parks Department
Greg David	Watertown, Citizen Member
Mark Dochnal	Fort Atkinson Public Works
Gary Ellerman	Trek USA, Waterloo
Scott Endl	City of Jefferson Parks Department
Steve Grabow	UW-Extension, Jefferson County
James Hartwig	Johnson Creek Village Board, County Board
Fred Holaus	Waterloo City Administrator
Mike Hoppenrath	Watertown City Clerk/Treasurer
Dale Horton	Sullivan Village Clerk
Tom Huber	Wisconsin Department of Transportation
Vern Johnson	Lake Mills City Manager
Ed Judziewicz	Tour de Fort Bicycle Club, Fort Atkinson
Joyce Lewnau	Tour de Fort Bicycle Club, Fort Atkinson
John McKenzie	Tour de Fort Bicycle Club, Fort Atkinson
Joe Nehmer	Jefferson County Parks Department
Ken Rolefson	Jefferson County Highway Department
Dave Saalsaa	The Quiet Hut, Whitewater
Bob Skalitzky	Lake Mills Parks Department
Dan Sobczak	Tour de Fort Bicycle Club, Fort Atkinson
John Stack	Palmyra Village Coordinator
John Steber	Watertown Parks Department
Dana White Quam	Wisconsin Department of Natural Resources

Public Workshops

Early in the planning process, two public workshops were held to gather citizen ideas, comments and concerns for bicycling and walking within Jefferson County. The first, held in Fort Atkinson on June 21, 1995, was attended by twenty four residents of Jefferson, Fort Atkinson and Whitewater. The following night, seventeen Watertown bicycle and pedestrian enthusiasts met to discuss similar issues affecting the northern portion of the county. While some participants were present in an official capacity, most seemed to be there simply to represent themselves and express their interest in bicycling and walking.

Workshop participants proved to be invaluable sources of local bicycling information. When asked to identify good and bad roadways for bicycling within the county, a variety of recommended routes and suggestions for facility improvements were given. This bicyclist input into recommended routes was later analyzed from a technical evaluation of roadway suitability characteristics to arrive at the routing recommendations contained within the plan.

In addition to mapping exercises, participants engaged in a brainstorming session in which the needs of area bicyclists and pedestrians were identified, discussed and prioritized. An enormous number of needs were identified, but there were five dominant themes that emerged from the workshops:

- Linkages ..... to local destinations
  to and between trails
  between communities
- Safety ..... safe facilities
  personal security
  separation from vehicular traffic
  safety education programs
- Access ..... to destinations
  across highways
  across rivers
  across town
- Quality ..... of facilities
  of maintenance
  of the environment
  of community life
- Encouragement ..... to increase use
  to promote benefits of biking and walking
  to slow vehicular traffic
  through mapping and signing

Of all the recommendations originating from the work sessions, five actions were identified by workshop participants as the highest priority implementation items. These actions indicate a depth and sophistication of the participants' understanding of the many elements that need to be addressed by a bikeway/pedestrianway plan.

- Develop public relations programs to promote benefits of bicycling and walking.
- Identify recommended bike routes through mapping and signing.
- Provide cross-town links to provide access to activity nodes.
- Provide separation from motor vehicles.
- Link communities with the Glacial Drumlin State Trail.

Key Person Interviews and Community Meetings

To supplement the planning direction provided by the public workshops, the consultants interviewed 34 public officials, staff from local, county and state government agencies, and persons with interests related to bicycling and walking. Information on local points of interest, amenities and rest facilities was gathered from the local Chambers of Commerce. Bike clubs furnished maps depicting preferred routes used for their organized rides. And on July 23 and 24, 1995, a series of nine meetings was held with representatives of the cities, villages and towns to discuss specifics of each community's bicycle routing issues and facility improvement needs.

Input provided by this broad cross-section of people helped to formulate action plans and facility recommendations to meet the bicycle and walking needs of Jefferson County.

The general public and advisory committee members were provided further opportunity to review and refine the resulting draft recommendations during another series of community meetings held November 28 and 29, 1995, and during a final meeting on March 19, 1996 to refine the plan's priorities.

Bicycle and Pedestrian Survey

A four-page questionnaire on bicycle and pedestrian interests and opinions was mailed to 1344 Jefferson County residents. Persons receiving the survey included members of the Tour de Fort Bicycle Club, members of Friends of the Glacial Drumlin Trail, and over 1000 residents who were randomly selected. The overall response rate was 13% (175 surveys returned), while the general public sample was 8% (91 returns).

The surveys were sent out with prepaid return mail. Because responses were optional, the results can not be considered to have statistical validity. Information supplied by respondents, however, indicates that all age groups and levels of interests are represented in the results.

Key findings:

- Most respondents, as is to be expected, were between 25 and 55 years old. Half came from cities, almost half from rural areas, and 5% from villages.

- Two-thirds of the general population classified themselves as cyclists. More than half use a bicycle at least several times per week. It is not surprising that members of bicycle clubs use their bikes more often and ride farther.

- Twenty percent of all respondents, and 15% of the general population use bicycles to commute to work.

- Twice as many people would like to use their bicycle to commute than are currently able to. This finding is the only significant difference between present practice and preferred opportunities. Otherwise, it appears that people are able to get to the places they want to go (but want to see improved routes to get there).

- The difference between practice and preference is greater when examining types of routes. People currently use all manner of streets, including busy roads, but would prefer bike lanes, paved shoulders and wider travel lanes. Interestingly, the number of people who ride on off-road recreational trails and the number who would prefer this type of route is the same (14%).

- Streets with paved shoulders and bike lanes are preferred over low traffic streets for riding. This is interpreted to mean that bicyclists would rather see improvements to the most direct transportation routes rather than be routed onto less direct side streets with frequent stop signs.

- Half of all cyclists use helmets all of the time, 28% never do. Almost all of the non-helmeted riders come from the general public rather than from bicycle clubs.

- Almost half of all respondents say they never use a light when riding at night. In this instance, bicycle club members are just as likely as the general public to disdain the use of lights.

- Bicycle education is overwhelmingly endorsed, particularly for younger riders and motorists.

- Bicyclists are most concerned about too many cars and trucks, aggressive motorists, unsafe intersections and the lack of bike lanes. They are least concerned about the effort needed to ride, the weather and the level of skill required.

- It is no surprise that pedestrians prefer sidewalks and trails for walking, although a significant number walk on low-traffic streets and find it preferable.

- Education for pedestrians is not rated as high as education for bicyclists. Those who find it important think it should apply evenly across all age groups.

Crash Analysis

An examination of crash statistics at the national through local level was undertaken to provide insight into the causes of traffic crashes involving bicyclists and pedestrians. Please note that these crashes are not accidents, but avoidable events caused by a single fact or chain of variables. Reducing bicyclist and pedestrian traffic injuries and fatalities can be accomplished by addressing such factors through safety and education efforts.

The following facts and figures summarize crashes involving motor vehicles and a bicyclist or pedestrian, as recorded on police reports. Unfortunately, the numbers do not represent the complete picture, as statistics on unreported crashes and those not involving a motor vehicle are unavailable. Nationally, recorded crashes are estimated to represent only 10 percent of all crashes that actually occur.

The statistics following are taken from the most recent data available: National numbers are based upon *Traffic Safety Facts 1993* from the U.S. DOT National Center for Statistics and Analysis. State statistics based upon *1993 Wisconsin Traffic Crash Facts*. County and community statistics based upon data for 1990 through 1994 as furnished by the WisDOT Division of Planning and Budget.

The Big Picture

- On average, a pedestrian is killed in a traffic crash somewhere in the United States every 93 minutes. For 1993, this accounts for approximately 14 percent of all traffic fatalities. The 5,638 pedestrian deaths which occurred that year represent a 17 percent decrease in the number of fatalities from 1983.

- Nationally, the 814 bicyclists killed in 1993 accounted for 2 percent of traffic fatalities during the year. This was 3 percent lower than the 839 bicyclist deaths reported in 1983.

Demographics of Pedestrian Crash Victims

- Nationally, almost 70 percent of the pedestrian fatalities were males. Older pedestrians (age 70+) accounted for 18 percent of the fatalities and exhibited the highest death rate for any age group.

- More than one-third of the children between the ages of 5 and 9 years who were killed in traffic crashes were pedestrians. One-fourth of the traffic fatalities under age 16 were pedestrians.

- Similarly, in Wisconsin the greatest number of pedestrian injuries and deaths occurred in the 5 to 14 age group (32 percent). Fatalities over age 65 represented 24 percent of all pedestrian deaths.

Demographics of Bicycle Crash Victims

- Nationally, most bicyclist fatalities were also males (87 percent), and between the ages of 5 and 44 years (79 percent). The national bicyclist fatality rate per capita is 7 times as high for males as for females.

- More than one-third of the bicyclists killed in traffic crashes were between 5 and 15 years old. The fatality rate for this age group is more then twice the rate for all bicyclists. However, the national percentage of cyclists killed under age 16 has dropped from 53 percent in 1983 to 38 percent in 1993.

- In Wisconsin, more male bicyclists were killed or injured than females (72 percent). Fifty-two percent of cyclists injured or killed were 5 to 14 years of age, for a total of 855 crashes involving this age group.

How We Rank

- A comparison of pedestrian traffic fatalities and fatality rates by state indicates that Wisconsin ranks as one of the ten lowest states in 1993, with 1.1 pedestrian fatalities per 100,000 population. (The District of Columbia is highest at 4.5, and North Dakota lowest at 0.6 per 100,000 persons.)

- For bicycling, the state ranks 39th, with 1.98 fatalities per million population. (Alaska is highest at 10.02 fatalities per million, with no reported bicycling fatalities in South Dakota, Vermont or Wyoming.)

- Jefferson County, the 21st most populous county in Wisconsin, ranks 18th highest in the state for the number of pedestrian crashes and 16th highest for bicycle crashes.

Breakdown of Crashes by Community

The following charts summarize pedestrian and bicycle crashes reported in Jefferson County during the past five years. Of the 125 reported crashes involving pedestrians, eight resulted in fatalities. The 102 bicycle crashes resulted in one death.

A Look at Contributing Factors

Jefferson County has experienced too few crashes over a five-year period to make any assumptions regarding locational causes of accidents. However, examining more comprehensive state and national data does reveal some locational, and more importantly, behavioral factors that commonly result in bicycle and pedestrian crashes.

Most Crashes Occur in Urban Areas

Bicycle and pedestrian injuries and fatalities occur more frequently in urban areas than in rural areas. (WisDOT defines urban as an incorporated area with a population of 5,000 or more; rural is unincorporated, or with less than 5,000 persons.)

	Pedestrian Crashes		Bicycle Crashes	
	Urban	Rural	Urban	Rural
Nationally	69%	31%	60%	40%
Wisconsin	83%	17%	83%	17%
Jefferson County	71%	29%	81%	19%

Severity of Crash Increases in Rural Areas

WisDOT also tracks crashes by severity, and statistics reveal the following percentage of persons injured vs. killed in urban and rural areas of the state:

	Pedestrian Crashes		Bicycle Crashes	
	Urban	Rural	Urban	Rural
Persons Injured	83%	17%	83%	17%
Persons Killed	52%	48%	30%	70%

Other Environmental Factors

- Nationally, most pedestrian fatalities occurred at non-intersection locations (81 percent), in normal weather conditions (88 percent), and at night (63 percent).

- Bicycle fatalities occurred more frequently at non-intersection locations (69 percent), between the hours of 4:00 pm and 8:00 pm (34 percent), and during the summer months of June, July and August (39 percent).

- Data from the Wisconsin Department of Transportation concurs with the national findings, showing similar patterns.

Pedestrian Behavioral Factors

For 74 percent of the pedestrians killed nationally in traffic crashes during 1993, police reported one or more contributing factors related to the pedestrian's behavior. Most often noted were:

- improper crossing of the roadway or intersection (38 percent)
- walking, playing, working, standing, etc. in the roadway (32 percent)

In Wisconsin, pedestrian actions reported to frequently cause crashes were:

- darting into the road (41 percent)
- walking not facing traffic (10 percent)
- dark clothing (8 percent)
- disregarded traffic signal (3 percent)

Bicyclist Behavioral Factors

For 65 percent of the bicyclists killed nationwide, police reported one or more errors or other factors related to the cyclist's behavior. Most often cited were:

- failure to yield right-of-way
- improper crossing of the roadway or intersection
- failure to obey traffic signs and traffic control devices

In fewer than half of the 1993 crashes involving bicyclists nationwide, the motor vehicle operators were cited by police for driving errors or other factors relating their behavior. When cited, the most common contributing motorist errors were:

- driving too fast for conditions or exceeding the speed limit
- drivers were inattentive (talking, eating, etc.)
- vision obscured

The Influence of Alcohol

Alcohol involvement -- either for the driver, pedestrian or bicyclist -- was reported in nearly one-half of all traffic crashes that resulted in pedestrian fatalities nationwide, and in one-third of the bicyclist fatalities.

- For pedestrian crashes, almost 33 percent of the pedestrians involved were intoxicated, while the intoxication rate for the drivers was only 15.1 percent. In 7 percent of the crashes, both the driver and pedestrian were intoxicated.

- In 27.7 percent of the bicycle/motor vehicle crashes, either the driver or the cyclist was intoxicated with blood alcohol concentrations of .10 g/dl or greater. Lower alcohol levels were reported in an additional 8.5 percent of the crashes. Almost one-fourth of the cyclists killed had a blood alcohol content of 0.01 g/dl or greater; and nearly one-fifth were intoxicated.

Roadway Suitability Evaluations

Various environmental factors combine to determine the suitability of streets and roadways for bicycle travel. However, personal factors also strongly influence the decision to bike or not to bike on a given roadway. Cyclists of differing skills will rate the suitability of the same street differently, based on their perception of safety along the route and their desire to ride for recreation or transportation purposes. For this reason, any methodology to rate roadway suitability must begin with an understanding of the different types of bicyclists.

The concept of a "design cyclist" is used to define three basic types of bicycle riders who have differing facility preferences and safety needs.[1]

- Group A, or advanced bicyclists, include experienced adult riders who operate under most traffic conditions and typically ride on collector and arterial streets.
- Group B, or basic cyclists, are casual or new adult and teenage riders who are less confident and capable of operating in traffic without special provisions for bicycles.
- Group C, or child bicyclists, typically refers to pre-teen riders who do not yet have a driver's license and whose roadway use is limited to residential streets with low motor vehicle speed limits and volumes.

Due to similarities in riding skills and facility preferences, the design bicyclist concept supports combining types B and C so that there are two basic classes of bicyclists: Group A riders and Group B/C riders. It is estimated that nationally Group A cyclists represent fewer than 5 percent of the population, while Group B/C riders comprise the remaining 95 percent.[2]

The Process

The initial step in determining which streets and roadways may be designated as bicycle routes in their current condition and identifying where facility improvements are most needed was to use a suitable model to evaluate the appropriateness of existing roadways for bicycling activities. Since types of bicyclists and traffic conditions vary significantly between urban and rural conditions, two separate methodologies were used for Jefferson County evaluations of community streets and rural roadways.

For each methodology, the consultants obtained available traffic volume and roadway characteristic data from WisDOT data bases, and supplemented this information with in-field observations and measurements.

Community Street Evaluation Methodology

Many methodologies have been recently developed to assist in assessing the suitability of urban streets for bicycle use. After a review of the available literature, a process of identifying the level of stress encountered by a bicyclist on a given street was selected for use within Jefferson County communities. (See page 19 for a discussion of rural roadways outside of the communities.)

The stress level concept originated in Geelong, Australia and has been further refined to reflect accepted U.S. roadway engineering practices.[3] The concept builds upon the idea that bicyclists wish to minimize physical effort in route selection, as well as mental effort or "stress." It focuses on three primary factors that contribute to stressful riding conditions: the amount of traffic, speed at which the traffic is operating, and the amount of roadway space for bicyclists to share with traffic. While other factors such as quality of pavement surface and aesthetics of adjacent land uses may contribute to the riding experience, these characteristics are not detrimental to route selection and are therefore not weighted as such in the stress level evaluation.

Using the bicycle stress level methodology, a numerical value ranging from 1 to 5, with 5 being the most stressful condition, is assessed to each of the three primary stress factors -- vehicular traffic volume, curb lane width, and vehicular travel speeds. These three numbers are averaged to give an initial stress level rating on the roadway segment.

As applicable, secondary roadway characteristics of percent truck traffic, commercial drives per mile and parking turnover rate are then evaluated. If higher than the initial rating, the secondary factors are averaged in to reflect less suitable bicycling conditions within these corridors.

The final ratings range from very low to very high stress, and represent a composite of the traffic factors previously discussed. The ratings also reflect an appropriateness of a street or roadway for use by cyclists of varying skill levels, as summarized in the table below. This table also identifies the thresholds used to determine the individual ratings for traffic volume, lane width and traffic speed, and thus indicates conditions that bicyclists may encounter when riding on such roadways.

The community maps that follow depict the stress level ratings for arterial and collector streets within each of Jefferson County's nine largest communities. (Maps are ordered geographically, beginning with Waterloo in the northwest and proceeding south and east throughout the county.)

In each community, the main arterial and collector streets were evaluated to locate bicycling opportunities and constraints. Neighborhood streets were not individually evaluated because traffic volumes on these streets are so low that the overall bicyclist stress rating would be either 1 or 2, which means that these streets are well suited to bicycling activities without any physical improvements.

Moderate to low stress routes have been incorporated into the Bike Jefferson County maps to be printed at the culmination of this planning process; and areas determined to be more stressful are programmed for facility improvements as presented in Sections II and III of this plan.

Rural Roadway Evaluation Methodology

As indicated on the following community maps, when travel speeds increase at the urban fringes, stress levels become high and very high. These ratings, which appear to be undesirable for bicycle travel using the stress level methodology, indicate that a different suitability model is more appropriate to assess rural bicycling conditions where vehicles travel at faster speeds.

For this reason, town roads, county highways and state trunks outside of the communities were evaluated using the methodology developed for the Wisconsin Bicycle Map.[4] The primary difference in approach between the two methodologies is that the rural process assumes that the candidate bike routes, which will typically be more than four or five miles long, will be used by adult cyclists and not youth under age 16. The rural planning process also assumes that motor vehicle traffic will travel at 55 miles per hour.

The basic roadway characteristics used in the rural suitability evaluations are similar to those used to determine bicyclist stress levels -- traffic volumes and pavement widths. In addition, percent truck traffic, percent yellow line and seasonal traffic peaking characteristics are factored into the evaluations.

In summary, the process establishes acceptable levels of traffic volume for roadways of various widths. It examines the occurrence of "bicyclist squeeze points," or how frequently a cyclist may be squeezed off of the roadway by a passing vehicle who simultaneously meets an oncoming vehicle. This situation, also known as a triple pass occurrence, is found to be directly proportional to the volume of cars and trucks using a given roadway. For this reason, lightly travelled routes and roadways less than 24 feet wide are generally found to be suitable for rural bike riding. These routes are typically not preferred by truck traffic, and the narrow pavement width forces vehicles to wait for a clear passing zone to overtake a cyclist, thereby minimizing the potential for bicyclists to be forced off the roadway.

The color map on page 63 depicts the results of the suitability evaluations for rural Jefferson County roadways. All state highways were evaluated using data contained in the WisDOT Deficiency File, and county highways using the Local Roads Inventory supplemented with field investigations. Selected town roads have been included in areas where no suitable alternative exists to get from one community to another.

In general, all paved town roads are more or less suitable for bicycling. The preference to use such roads depends on individual preference and directness of the route to reach desired destinations.